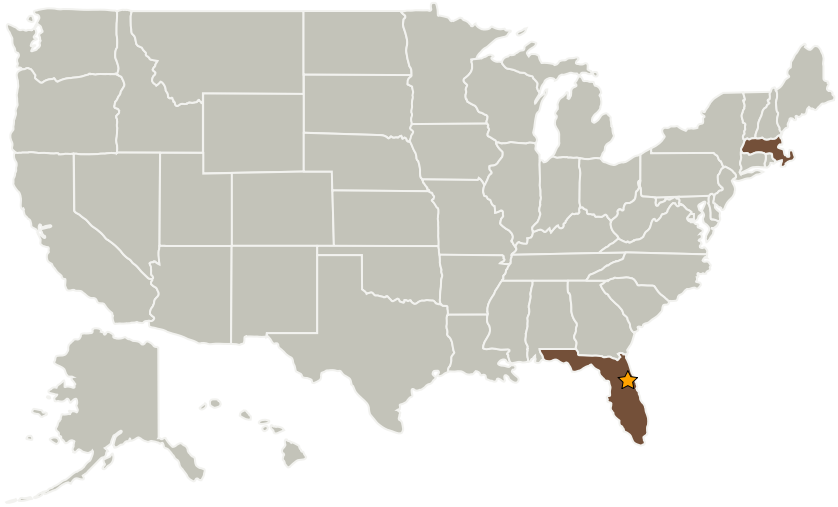
Molecular-Resonance Fiber Optic Gas Sensors, Phase I

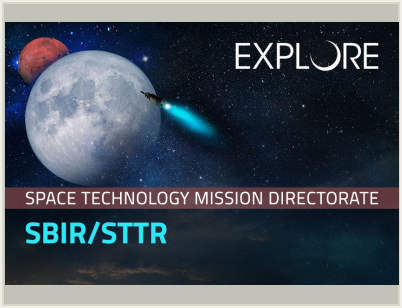
Completed Technology Project (2004 - 2004)

Project Introduction

Aspen systems proposes to develop an innovative and smart sensors to continuously monitor ambient air compositions by utilizing a resonating tunable micro-cavity technology. The new device will directly measure the unique vibrational resonance of gas molecules and determine its concentration for each constituent gas species. In Phase I, we will experimentally demonstrate the proposed concept by monitoring ambient air concentrations using the resonating tunable micro-cavity sensor. Selectivity and sensitivity of each gas species in air will be determined. Furthermore, we will determine linear response ranges of the proposed air monitoring system as a function of test gas compositions, including carbon dioxide and ethylene, temperatures and relative humidity. In Phase II, we will fabricate and test a prototype system for air monitoring in biomass production environments. Resulting smart gas sensors will be extremely compact, accurate, reliable, light weighted, low power consumption, no extra supplies required for operation and fully automated microprocessor controllable. Furthermore, the same gas sensing and monitoring system can be used to measure relative humidity, pressures and temperatures of ambient air by using slightly modified sensor designs.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Aspen Systems, Inc.	Supporting Organization	Industry	Marlborough, Massachusetts

Primary U.S. Work Locations	
Florida	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jae Ryu

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors